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[54] ACTIVE MATRIX DISPLAY WITH SEALING MATERIAL

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[58] Field of Search 349/149, 151, 349/153

[56] References Cited

U.S. PATENT DOCUMENTS

4,394,067 7/1983 Spruijt et al. 349/151

5,076,667	12/1991	Sterwart et al.	349/139
5,148,301	9/1992	Sawatsubashi et al.	349/153
5,517,344	5/1996	Hu et al.	349/149

FOREIGN PATENT DOCUMENTS

62-251723	11/1987	Japan .
64-49022	2/1989	Japan .

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[57] **ABSTRACT**

An active matrix liquid crystal display having improved reliability. Pixel regions and a peripheral driver circuit are integrally packed on the display. TFTs forming the peripheral driver circuit are located inside a sealing material layer on the side of a liquid crystal material, thus protecting the peripheral driver circuit from external moisture and contaminants. This enhances the long-term reliability of the peripheral driver circuit. Pixel TFTs are arranged in pixel regions. The leads going from the TFTs forming the peripheral driver circuit to the pixel TFTs are shortened. This results in a reduction in the resistance. As a result, the display characteristics are improved.

18 Claims, 14 Drawing Sheets

